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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,876	08/06/2003	Hideki Iwata	1713.1008	8217

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EXAMINER

ROJAS, BERNARD

ART UNIT PAPER NUMBER

2832

DATE MAILED: 11/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/634,876

Applicant(s)

IWATA ET AL.

Examiner

Bernard Rojas

Art Unit

2832

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 13 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-11,15,18,22,24,27,30-38,40,43,44 and 46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-11,15,18,22,24,27,30-38 and 40 is/are rejected.
- 7) ☒ Claim(s) 43,44 and 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>08062003 05092006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

The indicated allowability of claims 4, 5, 15, 18, 24, 26, 27, 30-38, is withdrawn in view of the newly discovered reference(s) to DeReus [US 6,876,482] and Hyman et al. [US 6,504,118]. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 34 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 34 recites the limitation "the stationary contacts of the second substrate" in line 13. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 15 is rejected under 35 U.S.C. 102(e) as being anticipated by Seki et al. [US 6,734,513].

Claim 15, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45] wherein the frame has a portion [22] that restricts in-plane movement of the movable portion.

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, 8-11, 18, 22, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki et al. [US 6,734,513] in view of DeReus [US 6,876,482].

Claim 1, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the movable portion has multiple contacts and the stationary contacts have branch portions contactable to the multiple movable contacts.

DeReus teaches a Mem switch [figure 7] with a movable contact portion [714] with multiple contacts [720, 722] that contact the stationary contact branch portions [716, 718].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact configuration of DeReus in the micro switch of Seki et al. in order to reduce the gap distance between movable contacts and stationary contacts, thus reducing the potential for shorting between actuation electrodes; insure reliable contact with stationary contacts because without contact bumps there is a potential for interference between movable contact and the substrate between stationary contact; and to provide design flexibility to meet contact resistance and current capacity requirements [col. 15 line 60 to col. 16 line 10].

Claim 5, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the movable portion has multiple contacts and the stationary contacts that are connectable to the multiple contacts and are provided independently.

DeReus teaches a Mem switch [figure 7] with a movable contact portion [714] with multiple contacts [720, 722] that contact the independent stationary contacts [716, 718].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact configuration of DeReus in the micro switch of Seki et al. in order to reduce the gap distance between movable contacts and stationary contacts, thus reducing the potential for shorting between actuation electrodes; insure reliable contact with stationary contacts because without contact bumps there is a potential for interference between movable contact and the substrate between stationary contact; and to provide design flexibility to meet contact resistance and current capacity requirements [col. 15 line 60 to col. 16 line 10].

Claim 8, Seki et al. discloses the micro-relay as claimed in claim 1, wherein interconnection lines extending from the first substrate to an outside of the micro-relay are flush with a surface of the first substrate [Fig. 4].

Claim 9, Seki et al. discloses the micro-relay as claimed in claim 1, wherein the movable portion is coupled to the frame by elastically deformable members [23].

Claim 10, Seki et al. discloses the micro-relay as claimed in claim 1, wherein the movable portion is coupled to the frame by hinge springs [23].

Claim 11, Seki et al. discloses the micro-relay as claimed in claim 1, wherein the movable portion is coupled to the frame by hinge springs arranged symmetrically [23, Fig. 3].

Claim 22, Seki et al. discloses the micro-relay as claimed in claim 1, wherein the second substrate has a flat plate shape [Fig. 4].

Claim 40, Seki et al. discloses the micro-relay as claimed in claim 1, wherein the frame has a thickness that defines spaces between the movable plate and the first stationary contact and between the movable plate and the second stationary contact [Fig. 4].

Claim 18, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the movable portion has protrusions that prevent the movable portion from sticking to the first substrate.

DeReus teaches a Mem switch [figure 7] with a movable portion [704] with protrusions [726, 728] that prevent the movable portion from sticking to the first substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact configuration of DeReus in the micro switch of Seki et al. in order to prevent to movable electrode from contacting the stationary electrode [col. 16 lines 60-65].

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki et al. [US 6,734,513] as applied to claim 1 above, and further in view of Hyman et al. [US 6,504,118].

Claims 6 and 7, Seki et al. discloses the claimed invention with the exception of using through holes in the substrate to interconnect the electrodes and the contacts outside of the micro-relay.

Hyman et al. teaches providing through holes in the substrate to interconnect the electrodes and the contacts outside of the micro-relay [figures 2a and 3a].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the micro-relay of Seki et al. in order to provide for the interconnecting of elements through the substrate as shown by Hyman et al. in order to facilitate connecting the elements by using exterior terminals {Hyman et al. figures 2a and 3a}.

Claims 24, 27, 30-35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki et al. [US 6,734,513] in view of Hyman et al. [US 6,504,118].

Claims 24, 27 and 30, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the second substrate has a stationary electrode facing the movable contact and a stationary contact that faces the moveable electrode.

Hyman et al. teaches a Mem switch [figures 5a, 5b and 5c] that hsa a base substrate [102] with a base electrode [117], movable portion [124] with movable contacts [120, 137] and a cover substrate [134] with a cover electrode [144]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch Seki et al. to include an electrode and a contact on the second substrate in oder to create a two way microswitch switch as shown by Hyman et al.

Claims 31, 32 and 33, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the contacts are used to transmit electrical signals, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the second substrate has a stationary electrode facing the movable contact and a stationary contact that faces the moveable electrode; and the movable contact is separated from the stationary contact of the first and second substrates in the absence of electrostatic attraction.

Hyman et al. teaches a Mem switch [figures 5a, 5b and 5c] that has a base substrate [102] with a base electrode [117], movable portion [124] with movable contacts [120, 137] and a cover substrate [134] with a cover electrode [144], wherein the movable contact is separated from the stationary contact of the first and second substrates in the absence of electrostatic attraction [figure 5a] and the movable contact is brought into contact with the stationary contact of the second electrode of the second

Art Unit: 2832

substrate [figure 5c] or the stationary contact of the first substrate [figure 5b] due the electrostatic attraction.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch Seki et al. to include an electrode and a contact on the second substrate in order to create a normally open two way microswitch switch as shown by Hyman et al.

Claim 34, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the second substrate has a stationary electrode facing the movable contact.

Hyman et al. teaches a Mem switch [figures 5a, 5b and 5c] that has a base substrate [102] with a base electrode [117], movable portion [124] with movable contacts [120, 137] and a cover substrate [134] with a cover electrode [144], wherein the movable contact is separated from the stationary contact of the first and second

substrates in the absence of electrostatic attraction [figure 5a] and the movable contact is brought into contact with the stationary contact of the second electrode of the second substrate [figure 5c] Or the stationary contact of the first substrate [figure 5b] due the electrostatic attraction.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch Seki et al. to include an electrode and a contact on the second substrate in order to create a normally open two way microswitch switch as shown by Hyman et al.

Claim 35, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the second substrate has a stationary electrode, and an interconnection line extending from the stationary electrode is extracted to an outside of the second substrate via a through hole formed in the second substrate.

Hyman et al. teaches a Mem switch [figures 5a, 5b and 5c] that has a base substrate [102] with a base electrode [117], movable portion [124] with movable contacts [120, 137] and a cover substrate [134] with a cover electrode [144], wherein an interconnection line extending from the stationary electrode is extracted to an outside of the second substrate via a through hole formed in the second substrate [figure 3a].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch Seki et al. to include an electrode and a contact on the second substrate in order to create a normally open two way microswitch switch as shown by Hyman et al.

Claim 36, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact [28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the second substrate has a stationary contact that faces the moveable electrode; and wherein an interconnection line extending from the

stationary contact is extracted to an outside of the second substrate via a through hole formed in the second substrate.

Hyman et al. teaches a Mem switch [figures 5a, 5b and 5c] that has a base substrate [102] with a base electrode [117], movable portion [124] with movable contacts [120, 137] and a cover substrate [134] with a cover electrode [144], wherein an interconnection line extending from the stationary contact is extracted to an outside of the second substrate via a through hole [140] formed in the second substrate [figure 2a].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch Seki et al. to include an electrode and a contact on the second substrate in order to create a normally open two way microswitch switch as shown by Hyman et al.

Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki et al. [US 6,734,513] in view of DeReus [US 6,876,482], and in further view of Hyman et al. [US 6,504,118].

Claims 37 and 38, Seki et al. discloses a micro-relay comprising: a first substrate [10] having stationary contacts [14b, 15b] and a stationary electrode [11]; a second substrate [40] arranged so as to face the first substrate; and a movable plate [20] arranged between the first and second substrates, the movable plate having a frame [22, 23, 30] and a movable portion, the frame being sandwiched between the first and second substrates to realize a hermetical sealed structure [Fig. 4], the movable portion having a movable electrode [24] facing the stationary electrode, and a movable contact

Art Unit: 2832

[28] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode [Col. 6, lines 35-45].

Seki et al. fails to teach that the second substrate has a stationary contact that faces the moveable electrode.

Hyman et al. teaches a Mem switch [figures 5a, 5b and 5c] that has a base substrate [102] with a base electrode [117], movable portion [124] with movable contacts [120, 137] and a cover substrate [134] with a cover electrode [144]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch Seki et al. to include an electrode and a contact on the second substrate in order to create a two way microswitch switch as shown by Hyman et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch Seki et al. to include an electrode and a contact on the second substrate in order to create a normally open two way microswitch switch as shown by Hyman et al.

Seki et al. also fails to teach that the movable portion has protrusions that prevent the movable portion from sticking to the first substrate.

DeReus teaches a Mem switch [figure 7] with a movable portion [704] with protrusions [726, 728] that prevent the movable portion from sticking to the first substrate.

Art Unit: 2832

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact configuration of DeReus in the micro switch of Seki et al. in order to prevent to movable electrode from contacting the stationary electrode [col. 16 lines 60-65].

Allowable Subject Matter

Claims 43, 44, 46 are allowed

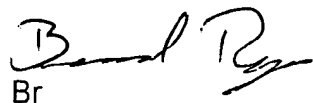

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Rojas whose telephone number is (571) 272-1998. The examiner can normally be reached on M-F 8-4:00), every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin G. Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2832

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Br
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SUPERVISORY PATENT EXAMINER
27 Nov 06